

a. 3659

THE
NATURE
OF
FERMENTATION
EXPLAIN'D;
WITH THE
METHOD

966 R
10

Of Opening the Body of any
GRAIN OR VEGETABLE SUBJECT,
So as to obtain from it a
SPIRITUOUS LIQUOR:

EXEMPLIFIED

By the PROCESS of preparing RUM, as
'tis manag'd in the *West-Indies*.

With many other useful REFLECTIONS and
OBSERVATIONS.

To which is added,

A COLLECTION of several *Compound Cor-
dial Waters*, with the ART of preparing some
Artificial Wines, not hitherto publish'd.

By Way of APPENDIX to the *Compleat Body of
Distilling*.

R.

By GEORGE SMITH of Kendal in *Westmoreland*.

LONDON:

a. 3659.

Printed for BERNARD LINTOT between the
Temple-Gates. MDCCXXIX. Price One Shilling.

THE NATURE OF THE MENTATION EXPLAINED WITH THE METHOD

OF THE
CLASS OF VIGILANT SUBJECTS



OF THE
PROCESS OF PREPARING RUM, AS
IT IS MANAGED IN THE W. I. INDIES.
AND MANY OTHER INTERESTING
CIRCUMSTANCES.
COLLECTED BY
THE
LORD OF APPENDIX TO THE COMPANIES

George Smith of London
LONDON

Printed by J. Smith, at the British Museum, in the Strand.



PROCESS I.

CONTENTS.



<i>Antiquity of Distillation</i>	Page 1
— <i>its first Authors</i>	Indices 2
— <i>the promoters of it</i>	4
— <i>its excellency</i>	ibid.
— <i>its use</i>	5
<i>Of Fermentation</i>	6
— <i>effected in Vegetables</i>	ibid.
— <i>the nature of their seminal Spirit</i>	7
— <i>nature of Camphir</i>	ibid.
— <i>no Spirit can be obtain'd without Fermentation</i>	8
<i>The materials of Fermentation</i>	9
<i>The air the principal Agent of Fermentation</i>	10
<i>Cartesius's definition of the air</i>	ibid.
<i>Its tone considered</i>	ibid.
<i>Fermentation how varied by the Weather</i>	11
— <i>Spring and Autumn best for this work</i>	12
— <i>attributed to the variableness of the weather</i>	ibid.
<i>A 2</i>	— proved

The CONTENTS.

— proved by the Barometer	page 13
— the vinous and spirituous taste of the Li- quor whence deduced	14

PROCESS I.

O F distilling Low-Wines for Rum	15
— as practised in the West-Indies	16
— Fermentation thereof promoted by the Sea and Land Breezes	ibid.
— forwarded by casting in of Sea-Sand with the reason thereof	ibid.
The Time of Fermentation allow'd in the West- Indies	17
The Reason why Rum can't be produc'd in our Climate like to that in Jamaica, &c.	ibid.
Subjects which superabound with oily parts, fer- ment with the greatest difficulty	ibid.
One cause of the taste of Rum attributed to an Empyreuma	18

PROCESS II.

O F distilling Low-Wines into Rum	19
Remarks upon the preparation and keep- ing Low-Wines	ibid.
The strength of Liquors, owing (in a great mea- sure) to their Tartar	20

Prov'd

The CONTENTS.

<i>Prov'd by Rhenish Wine in Distillation</i>	p. 20
<i>The requisites to obtain a Spirit in its due per- fection</i>	ibid.
<i>The Rummish Flavour again consider'd and ex- plained</i>	21
<i>— how the same might be resembled here</i>	22
<i>Remarks upon the methods used in Barbadoes to procure it at a very cheap rate</i>	ibid.



PROCESS III.

H OW to extract a vinous and spirituous Liquor from Mollosses, Sugar, &c.	23
<i>How to promote the Fermentation</i>	ibid.
<i>The Consistence of the Fluid is to be consider'd in regard to its particular Ferment</i>	24
<i>Proper Ferments adapted to each particular case and nature of the body fermented</i>	ibid.
<i>Whether the Barm ought to be put into the Still along with the Wash</i>	25
<i>How to distill the Lees of all Wine, &c. to the best advantage</i>	26
<i>Malt or Molosses Wash, could suffer no damage nor loss of Spirits by a previous coction</i>	27
<i>Proved by Experiments</i>	ibid.

PROCESS

The CONTENTS.

PROCESS IV.

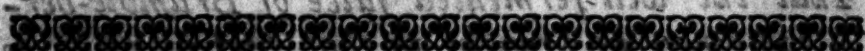
O F preparing the Wash for Low Wines, and Proof-Spirit from Malt	Page 28
The product of Low Wines and Spirit from this Process	29
How to open the body of any Grain	ibid.
Several Quæries solved	30
Aqua Vitæ composition	31
The virtues of it confirmed by authorities	ib. & 32
Another compound Cordial Water	33
Heurnius's elegant description of its virtues	ibid.
Aqua Vitæ Aurea	34
Lucas Ghinus his account of its use and vir- tue	ibid.
Heurnius his method of taking it	35
Hypocras, a medicalid Wine	ibid.
— how best made	36
Alexipharmick Cinnamon Water	ibid.
Our compound Poppy Water	37
Its use and virtues	38
Claret, or Nectar, from Gesner	ibid.
Its use and virtues	39
Spirit of Clary	40
The reason of the Process	42
How performed to the best advantage	ibid.
Spirit of Clary by Fermentation	43
— Some cautions in the Process	ibid.
— how	

The CONTENTS.

How to avoid some inconveniencies	P. 44
Another very expeditious Process	45
Its physical virtues extolled by Ermuller	ibid.
Its usefulness in enriching and altering the taste of artificial Wines	46
How Spirit of Clary, mixed with artificial Wines, makes them resemble and bear the perfect signature of most of the richest foreign Wines	ibid.
That the well fermented juice of Bramble-berries may be brought to that perfection as to equal French Claret, confirmed by Experiment	ibid.
The Conclusion argues, that many fermented vegetable juices of our own product, might by good management be made to equal some of the best Wines we have imported into the Kingdom	47
Spirit of Elder-Berries, the Process	ibid.
How Elder Wine is made in the greatest perfection	48
How to obtain the Spirit from the said Wine, when grown unfit for use, with their virtues and uses	ibid.
How to amend the said Wine when low or grown vapid	49
How to make dulcifying to meliorate Wines, &c.	50
How the same, by the assistance of some spirituous body, may improve artificial Wines, and so change their flavour, as scarce to be distinguished from the genuine foreign ones	51
Artificial Malaga Wine	ibid.
	How

The CONTENTS.

<i>How to enrich the same, or change it into several others</i>	P. 53
<i>That Lees of Wine added in Fermentation very much improves them</i>	ibid.
<i>How some particular ingredients shall change the taste of Liquors</i>	54
<i>How to make Spirit of Cyder, with its uses</i>	ibid.
<i>The Conclusion</i>	55



Books Printed for BERNARD LINTOT.

I. THE Practical Distiller, or, A brief Treatise of Practical Distillation. In which the Doctrine of Fermentations is methodically explain'd in a new Method. With the Description of a new Engine Still engrav'd on a Copper-Plate, which, for dispatch of Business, is preferable to any other. To which is added, by way of Appendix, a Treatise to make Artificial Wines from several Fruits of the English Production; interspersed with many useful Reflections and Observations. Price 1s.

II. The British Cook's Companion: Being a Collection of four hundred of the newest and best Receipts, in Cookery, Pastry, Pickles, Cakes, Mackroons, Biskets, Ginger bread, French-bread, Preserving, Conserving, Candying, and Drying Fruits, Confectioning and making of Creams, Syllabubs and Marmalades of several Sorts, Jellies, Made-Wines, Cordials, Beautifying Waters, Ointments, Powders, &c. With Copper Plates setting forth the Manner of placing Dishes upon Tables. The proper Seasons for Fish, Fowls and Rabbits; with Bills of Fare for every Month in the Year. Receipts for Twenty-five different sorts of Puddings; and one, excellent for curing the Spleen. Fitted for the Use of all publick and private Families. By Henry Howard, Free Cook of London. The Fifth Edition. Price 1s. 6d.

THE

drawing near its period. And here I shall not



due and immoderate use of them, when drunk for

pleasure: new ton, spirit, and such thing, nor even an

As to the Invention of Distillation, it is by the general

content of all learned men ascribed to the Arabians

and amongst others introduced this also into the

science. To this our wise Men, as a very

learned author, who speaking of the antiquity of

Distillation, says, I have observed, that the

art of Distillation, which was

by tracing it up to the 10th century, which was

the time of the Arabians, who by drinking

not being in a condition to mix with them;

the controversy being chiefly between Arabians and

the Greeks, who were the first who invented it.

Mr. Boyle, who was the first who attempted to

explain the nature of Fermentation, which may

be justly look'd upon as the very ba-

sis or groundwork of Distillation, 'tis

BEFORE I attempt to explain the nature of Fermentation, which may be justly look'd upon as the very basis or groundwork of Distillation, 'tis necessary that I premise something by way of preface, concerning the antiquity and usefulness of this art; which by the intemperance and debauchery of some persons has been so reduced in its Credit of late, that it may seem to be

B draw-

drawing near its period. And here I shall not undertake to defend or encourage the excessive tippling of inflammable spirituous Liquors, which is too much in use at this day, to the detriment and discouragement of the science: But on the other hand, whilst I lay open their virtues and usefulness in regard to Medicine, I shall endeavour to shew the sad effects which follow upon the undue and immoderate use of 'em, when drank for pleasure.

As to the Invention of this art, it is by the general consent of all learned men ascribed to the Arabian Physicians, who considerably enriched the stock of Medicine with many useful discoveries, and amongst others introduc'd this also into the science. To this purpose writes *Heurnius*, a very learned author, who speaking of the antiquity of Distillation, hath these words: *Non nuper nata hec præcellens ars: Nam Albucasis, Rhazes, & ejus auditor Avicennas, qui circa annum octogesimum supra millesimum à partu Virginis floruerunt, de hac tanquam jam receptâ & evulgatâ arte loquuntur, &c.* Our author here gives us an idea of its antiquity, by tracing it up to the 10th century, which was about the time of *Albucasis*, who liv'd much later than the two other authors, and therefore cannot share in the glory of the invention with them; the controversy lying chiefly betwixt *Rhazes* and *Avicenna*. Mr. *Le Clerc* fixes the epocha of it to the time of *Avicenna*; because in two several places of his works he mentions a *Rhodostagma* or Distill'd Rose-water. But the late learned Dr. *Friend* hath proved that the same ought rather to be attributed to the former, who very plainly describes the process of the *Ol. Benedictum, seu Philosoporum*, with all its proper Apparatus, and this long before the time of *Avicenna*, who was born near fifty years after the death of *Rhazes*; and

F E R M E N T A T I O N *explain'd.*

and therefore 'tis very probable he took the method from him. But be this as it will, in those early days the art was confined to very narrow limits, not extending beyond two or three processes at most, nor do we find the least mention of any Distill'd Cordial Water. For tho' Mr. *Palin* blames and condemns them as the first introducers of Cordial Waters into Medicine, 'tis certain that for near three hundred years afterward we meet with no such thing, not even in *Mesue* himself, who lived toward the close of the 12th century, and writ his *Antidotarium* or *Pharmacopœa* for the use of Apothecaries, in which he has collected most of the Medicines then in use.

Arnoldus de villa nova, an excellent Chymist, who flourished about the middle of the next century, is the first, I think, who in his *Breviarium Practicæ*, takes notice of some Distilled Spirituous Liquors; as *Aqua Mirabilis*, &c. *Gulielmus de Saliceto*, *Placentinus*, and *Thaddæus Florentinus* contemporaries, who lived about the same time with *Arnold*, amongst other compound Distilled Waters, make mention of that useful *Menstruum* the Spirit of Wine, (the first hint I think we have of it) though I am inclined to believe, that as the use of fermented Liquors was known long before the days of *Rhazes* and *Avicenna*, the way of obtaining an ardent or inflammable Spirit from 'em could not escape their knowledge; though perhaps for some private Reasons, the same was not presently divulged or made publick. However it was, it got footing soon after the *Arabian* doctrine arrived in *Europe*, which met with such a favourable reception among the learned, that from the eleventh to the close of the fifteenth Century, it was the only received doctrine of the schools; in which time this new branch of Pharmacy found its admirers, who began to cultivate

4 The NATURE of

it with such success, that it immediately grew up to its state of maturity; for in a very short time afterwards we meet with a long train of authors, who wrote particularly upon this subject. Thus *John Michael Savanorola*, a *Paduan* physician of great esteem, published a treatise in praise of Distilled Cordial Waters, entitled, *De arte conficiendi Aquam Vitæ simplicem & compositam, deque ejus admirabili virtute ad conservandam sanitatem, &c.* in which he sets forth their uses and excellency, as well in the preservation as in the restoration of health. And herein he was followed by a great variety of authors, some of whose names I shall just mention for the reader's satisfaction, without being scrupulously exact as to the times wherein they lived. The chief of these were *Hieronymus Rubens*, *de Distillatione Liber, sive de Stillatitiorum Liqueurum, &c.* 2. *Adam Lonicerus*, *Histor. Naturalis, &c. quibus accessit de Stillatitiorum Liqueurum ratione, ejus artis & instrumentorum usu.* 3. *Bartholomæus Vogter*, *de morborum Curatione per Aquas Distillatas.* 4. *Claudius Deodatus*, *de vero & legitimo Aquæ Cordialis concinnandi modo & utendi ratione:* Not to mention *Andreas Libavius*, *Jo. Baptista Porta*, and several other learned physicians who have treated professedly hereof: Besides others who have written only some transient Pieces upon this subject, which are to be met with amongst their other works, and of which an infinite number might be collected. But these I think are sufficient to establish the reputation of the Art.

The excellency and usefulness of Distillation *Heurnius* thus elegantly sets forth in his *Metb. ad Praxin, Lib. III. Cap. 27.* in the following Words; *Et cum elegans illa Ars (viz. Distillatoria) hodie emicuerit, quæ liberare docet vires à mole corporeâ, succis, salibus ac oleis à terrestri mole abductis, ut*

ægri-

FERMENTATION *explain'd.*

5

ægrî remediôrum cômmodo sine eorum fastidio fruuntur, quantum fieri poterit, his utemur. And in another part of his Works he is no less profuse in its commendation; *Fatendum est, says he, Medicinam vix & ne vix dum Gratiis sacrificaturam, sine elegantissimâ hac distillandi Arte, quam non modo utilissimam existimo, quin potius necessariam; ut sine qua, ne vita quidem satis commode duci possit, cespitat jam profectò sine hac arte Medicina; hæc potentissimis ignis Liquores elicit ex Herbarum &c. omnibus partibus, qui Saporem, Odorem ac Vim gerunt earum partium unde dimanarunt.* The encomiums he here gives of this art, are very extraordinary; and he has confirmed the truth of 'em, by the usefulness and necessity of it in medicine, without which physick would be in a manner imperfect; as it teaches the method of separating the pure from the impure, and the more subtil and delicate parts of bodies, from the more gross and excrementitious. Upon which consideration *Ambr. Paræus*, a very experienced Surgeon, declared that medicines thus separated (*viz.* by Distillation) from their earthly impurities, were thereby render'd of a singular and almost divine efficacy in the cure of Diseases.

And thus much for the antiquity and usefulness of this art, and of the Cordial Distilled Waters, which are the product of it, so far as they relate to Medicine. Nor is it my design to extend the commendations of them farther; and under this restriction they will truly bear up their credit, by answering all the ends desired, and that is as much as can be expected from any remedies; for there's none of 'em, which if used preposterously, or indiscreetly, will not produce as many fatal consequences as the other, which of late have fallen under a publick *Oidium*.

Of Fermentation.

THE nature of Fermentation has been so much controverted amongst authors; who have endeavoured to explain it, that several learned men have rather chosen to pass it over in silence, than bring their reputation into dispute, by attempting to unfold the different appearances, arising in different subjects, or even so much as to declare what they really think it is; contenting themselves with shewing only the effects, without ever searching into the causes of it; and yet they all agree in this, that it is an intestine motion of the particles of mixed bodies, tending either to the perfection or manifest alteration of the subject; tho' they have differed so much concerning the primary cause, or principal agent which raises this commotion. To recite all the opinions that have been advanced upon this head, would be more tedious than instructive; and as our subject leads us only to the raising a vinous and spirituous Liquor from Vegetables, we shall exclude all the chymical effervescences, ebullitions, and other anomalous species of Fermentation as foreign to our present design. And here we are to consider, that all bodies fitted for this work, are such as have arrived at their utmost state of maturity and perfection; at which time the juices of vegetables having received their due exaltation from the preceding heat of the summer's Sun, which has rarified their contained fluids, and being by repeated and continual circulations still more and more attenuated, subtilized and broken, they at length undergo all the requisite digestions and comminutions in the vascular part of the Plant, whilst many of the more volatile and fragrant particles make their escape, and

and fly away; as appears from the odoriferous *Effluvia* which arise from the flowers of several aromatick Vegetables. And thus they are encompassed with a kind of atmosphere, made up of the most active and volatile elementary principles, originally lodged in them, and which seem chiefly to be of a saline-sulphureous nature; and probably are no other than the volatile Camphor of the Plant, which exhales insensibly from it, being drawn upwards by the heat of the ambient Air through its pores, or insensible *spiracula*. And this seems evident from the aforesaid natural composition, which we call Camphor, which readily moulders away into Air when exposed to it; though otherwise it may be kept a tolerable space of time, if well secured from it. And this white concreted matter is generally looked upon as the essential Oil of the Plant, from whence it flowed, enriched with a portion of fine volatile Salt. Betwixt which two principles there seems to be a great affinity; for some of the rich *Asiatick* Oils, when long kept, and duly preserved from the Air, have been observed at length to concrete into a kind of saline substance, as *Celsus*, *Homburg*, and the learned *Boerhave* inform us. And here it may not be amiss to observe, *first*, That as Camphor is the sole product of nature, arising from a conjunction of a fine thin ætherial Oil, and a volatile Salt; these very principles must have existed, and been inherent in the subject during the time of its growth or vegetation. And *secondly*, that the same must necessarily have undergone a previous concoction (if not a Fermentation) before they could arrive at such an elaborate substance: And *thirdly*, considering the exceeding subtilty and inflammability of them, and their readiness to unite with Alcohol, or rectified Spirit, so as to form one homogeneous fluid (at least to a considerable

ward appearance) when at the same time they will not mix with any of the other elements; it seems indisputable that they are of the same nature and quality (if not their main basis) with all inflammable spirituous Liquors obtained from Vegetables, by means of Fermentation. For I can by no means acquiesce in the opinion of some learned men, who have attributed it to an alkali and acid, mutually acting upon each other, that the said essential Oils are changed or converted into inflammable Spirits: For why should we introduce the notion of alkali and acid in this matter, when we see that the constituent principles of the subjects, by the assistance of a proper *Medium*, are capable to free themselves from their combinations, and exalt this Oil into a burning Spirit, by means of a due Fermentation; which otherwise could never (or at the least without great pains and difficulty) have been effected; as is evident from the Distillation of unfermented vegetable juices, whence nothing can be extracted, but an insipid phlegm and Oil. For instance, were you to distil the strongest Wort that could be drawn from Malt, or the richest Hydromel, without a previous Fermentation, you would obtain only a vapid phlegm, or an ill tasted Water, destitute of all distinguishable qualities of a vinous or spirituous Liquor, though at the same time replenished with the principles from which those inebriating substances have their being. From whence it appears, that the most elaborate and perfect vegetable juices, or the strongest decoctions of 'em, will not afford a spirituous fluid before they have felt the effects of Fermentation. And the same holds good in all other juices of this class, although never so pulpy, ripe and perfect. And this gives us a true notion of the composition of all artificial Wines and

FERMENTATION *explain'd.* 9

and Brandies extracted from 'em, and the absolute necessity of fermenting Liquors for this purpose, as without it they could never be obtained.

The materials requisite for Fermentation are chiefly deduced from the subject, in which four elementary or constituent principles are most apparent (upon *Analysis*) viz. An Earth and Water (called phlegm) with a Salt and Oil; to which a fifth is generally added under the denomination of Spirit. But as this is of an ambiguous signification, I have rather chosen to omit it, and own my ignorance of it, than pretend to declare what that subtil *Aether* or seminal Spirit is, which is accounted the *Archæus*, or rector of the whole: Whatever it be, 'tis so small in quantity, and withal of so subtil and fugitive a nature, that very little thereof can be obtained by art. What resides in the Oil, doubtless we may procure, when the same becomes attenuated and rarified to a spirituous substance. For 'tis universally agreed that Spirit is nothing but the essential Oil, so broken and divided as to take upon it the forementioned form. These principles being so apparent in all bodies, I look upon them as the source of that fermentative action, which exalts the fluid from a state of crudity to that of the utmost perfection it is capable of. But as it hath been objected, that there are several (and even fluid) bodies, wherein most or all of the chymical principles have been found to lie *quiescent*, or as it were, at rest together, 'till by some accidental cause they have been actuated, or put in motion, and therefore they cannot themselves be accounted the principal instrument or first mover of 'em, if that old axiom holds good, *Nil dat quod non habet*, we must then have recourse to some other assistance. And this only must be derived from
the

the Air, for it hath not hitherto been sufficiently proved (by any experiments) that any body whatsoever is capable of rarefaction and condensation except the Air, a body, fluid, heavy and elastick, compressible it self, and able by its weight to compress others, subject to many alterations, in regard to place, climate, season of the year, time of the day and night, motion of the winds, &c. whereby its tone, or the measure of its rarity and density, suffers considerable and very often sudden changes; which depends in a great measure upon the fluxility and composition of its particles, which *Des Cartes* has compared to soft *floculi*, or down of feathers, *Cartes. Princip. Philosoph. Pax. IV. pag. 138. Aer.* says he, *frigore facile densatur, & rarefit calore. Cum enim ejus particulae fere omnes sunt fluxiles instar mollium plumularum, quod celerius aguntur, ad latius extendunt, & idcirco majorem spatii sphaeram ad motum suum requirunt, &c.* The Air then being a body so fluxile and variable, must needs have different effects according to its rarity or density, whereby its weight or pressure will be considerably augmented or diminished one time more than another, and consequently the surface of all bodies will be affected accordingly; but especially the fluid and mixed bodies will suffer most, as there is contained in them the greatest proportion or quantity of included Air, or *Aether*. And such are these bodies which particularly belong to our present subject, as Must, Wort, Honey'd-water, the fresh expressed juices of ripe Fruits, or Berries, and in general, all Liquors, or new Wash designed for Fermentation, in order to raise a vinous and spirituous Liquor from 'em. For these contain not only a greater quantity of a fine subtil Air or *Aether*, than other less compounded bodies do, as their specifick gravity and

prone-

FERMENTATION *explain'd.* II

proneness to Fermentation plainly demonstrates, but likewise a mixture of heterogeneous principles or elements, which are put in motion by virtue of the aforesaid *Medium*; which pressing upon the fermentable mixed bodies, must necessarily put the constituent particles of 'em into vibrating motions; and the internal Air in the mean while, as likewise partaking of the same elastic quality, must consequently endeavour to expand it self; and hence will arise a greater commotion and collision of the contained principles, as by this means they must be continually driven and forced against one another, till at last their combinations being broken, the spirituous and lighter particles will endeavour to make their way toward the surface, whilst the grosser and heavier have their tendency downwards. And this confusion of the elementary particles is the reason why fermenting Liquors always appear turbid and thick; the pores of the watry vehicle or dissolvent being replete with the corpuscles of the other bodies, variously agitated and comminuted by means of the intestine motion, occasioning a fresh intercourse and occurrence of 'em, whereby the internal Air will be more rarified, and consequently endeavour to expand and dilate it self with the greater force, according to the gravity or weight of the incumbent Air, upon which the work of Fermentation does in a great measure depend. Thus we learn from experience, that in a cold or frosty season, Liquors will very difficultly ferment, unless kept near the fire, or in a very warm place, in order to unbend the spring of the included Air, which is in a manner locked up and imprisoned by the cold weather; at which time the incumbent atmosphere is also very much contracted, as may be seen by the Spirits in the Thermometer. Likewise in very hot sultry weather, when this element

element is very rare and thin, the contained principles of bodies, by the mediation of the internal Air, (expanding and dilating it self with great violence) are very much broken and subtiliz'd, and therefore apt to fly off at the surface; especially the more volatile and spirituous particles, leaving the residue a dead and vapid substance: Which accident is very common to Malt-liquors made in a sultry season, at which time they will scarce bear up the Yeast, or Froth at the top. And the reason is, the included air which acts by its elasticity, as the incumbent atmosphere doth by its gravity or weight, being then exceedingly rarify'd, forces its way to the top of the Liquor, where in a moderate degree of warmth it raises those vesicles on the surface which we call yeast or flowers, form'd of the thicker part of the Liquor; by whose viscidty it is detained as in so many little *Capsulae*, retaining likewise the spirituous *Effluvia* from passing off. But when by too great a degree of heat, as in the abovemention'd case, these little bladders or blisters are forced open by the too great dilatation of the Air, and the surface of the Liquor is left naked and destitute of its common covering; the Liquor must consequently hereupon become pall'd, ropy, and thick. To obviate which inconveniences the Brewers, when they design their Beer for long keeping, chuse the Spring and Autumn for this work, especially those two noted months *March* and *September*, (windy months of an unequal temper) at which time the work of Fermentation best succeeds; which may be attributed, not only to the moderate quality of the Air, but also to the variability and sudden changes of it, in regard of its tone and temperature, which daily and even hourly changing, doth some time accelerate, retard, and then restore this intestine motion, according to

to the disposition of the *Medium*. How the same is effected by heat and cold, hath been already exemplify'd by the sinking or rising of the Spirits in the Weather-Glass, according as the heat or coldness contracts or expands the Air; and as the compound fluid is continually in motion, its frequent reciprocations, or access and recess to this or that degree of rarity and density, will have the same effect on fermenting fluids, and admit of the same considerations as before. Which needs no other proof than the Barometer, the former distinguishing the temperature as the latter doth the tone of it; and this is most conspicuous when the air is violently or strongly moved. As for instance, a brisk wind lessens the pressure of the incumbent atmosphere, at which time the Quick-silver sinks lowest in the Barometer, and then is the internal Air for want of its due pressure, exceedingly dilated and expanded; from whence a greater commotion and turgescency in the subject will arise, by which means the contain'd particles will be agitated more forcibly, and as it were kneaded together, the better to make them work, and rise in a ferment; which we daily see succeeds best in windy weather, when the motion of the Air is uncertain. At which time if the intervals of rest be any thing considerable, the Mercury will ascend and descend even the same day several times. Whence we may conclude that from these reciprocations or sudden fluxes and refluxes of this element, the elementary particles of bodies, especially such as are *in fluore*, and contain a due quantity of this *Aura* in their pores, must suffer considerably in their nature by the frequent and repeated concussions received herefrom: Whence there must of necessity ensue a collision or dashing together of the constituent principles. Some of which, as the fixed Salt, or

Tartar,

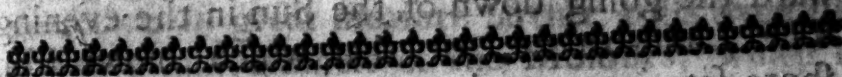
Tartar, (wherewith most fermentable Liquors abound) consisting of hard rough particles, colliding against each other, may, if the conflict be great, produce a heat (an inseparable concomitant to motion) and from thence a greater rarification; the consequence of which will be a total separation of the principles from each other, and consequently a change in the nature and quality of the fluid fermented. For, as it hath been before observed, the combination of the principles being in this intestine struggle entirely loosed from their mutual and strict band of unity, the essential Oil and Salt thus set at liberty from the earthy and fixed particles, will be attenuated, rarified and divided still more and more by the continual and frequent collisions of the harder bodies; till at last they have acquired their utmost degree of subtilty and fineness, so as to occupy or fill up the pores of the liquid *Menstruum*; (like as Salt or Loaf-sugar, &c. dissolved in common Water, lies therein inconspicuous to the eye, tho' at the same time perceptible to the taste.) And the same holds true here, for these very principles (I have been speaking of) are here wrought up to such a degree of fineness, as to swim imperceptibly in the fluid, and are that which imparts the vinous and spirituous taste thereto, the grosser elements subsiding and falling down to the bottom in form of Lees; whilst the aerial particles, which upon the account of their levity can't keep their former places, are carried up to the top in form of blisters, surrounded by the viscid parts of the Liquid forced up along with them, leaving the main body of the fluid *Menstruum* clear and limpid, of a vinous taste and flavour.

These things being premised in general, I shall, farther to confirm them, mention some few particular Instances, in which I shall deliver

(by

FERMENTATION *explain'd.* 15.

(by way of processes,) the usual methods of raising a vinous Liquor from vegetable productions, and from thence by Distillation an inflammable spirit. And these for brevity sake, I shall reduce under two general heads, (*viz.*) the juices, and seeds of vegetables; each of which requiring a different method or form of preparation, will be sufficient to give light to all the rest. The first I shall begin with, is that of vegetable juices; which by one or two examples familiarly laid down, will exhibit all that is requisite for this division; and as there is none more common and useful (especially in Medicine) than those spirituous Liquors, which are extracted from the juice of the Sugar-Cane, (*viz.* Molosses and Sugar) which are the basis of all compound Distill'd Waters (especially the better sort of them) I shall briefly shew the true Way of preparing that much admired Cordial Liquor, call'd Rum, as I have seen it practis'd in the *West-Indies*, which is after this manner.



PROCESS I.

Exhibiting the manner of distilling Low-Wines for Rum, after the method used in the West-Indies.



FILL a large Vat or Vessel near three Parts full of River-Water, to which add as much new Molosses, as will sweeten it like Beverage, or till it be so strong as it will bear up an Egg, (which will require about one third part of the latter) then beat

beat them up very well together, till a froth begin to appear on the surface, and let the Liquor stand fermenting for the space of twelve or fourteen days, more or less, till it cease working; then skim it clean and put it into your Still, which must not be above two thirds full; lute close the junctures, and with a moderate fire draw off the Spirit till it begin to taste of the *Magma* or *Faces*. This Liquor goes under the denomination of Low-Wines, which are to be kept in a wooden Vessel close stop'd or cover'd up for use.

This is the true method of distilling Low-Wines for Rum, as practised in the *West-Indies*, of which I have been an eye-witness several times. The Vat or Cistern, which is very capacious, wherein they usually ferment the Liquor, stands for the most part in an open Shed or Hovel exposed on all sides to the Air, which in those countries (as is well known) is very variable, as to calms and gusts of wind. The Trade-wind or Sea-breeze blows from Sea-ward all day long, especially from about ten a-clock in the morning, till toward the going down of the Sun in the evening. The Land-breeze, or that which blows from shore sets in pretty late at night, and continues till toward Sun-rising, later or sooner according to the season of the year: during which intervals or changes of the wind there is a profound calm night and morning. This I have purposely remark'd to shew, that these variations of the winds are the chief causes in promoting Fermentation in those countries, where they make use of no manner of Ferments. The reciprocal motions of the internal and external air are generally sufficient to forward the operation; only at some times, when it appears to be somewhat slow in working, they throw in a little, hot, clean Sea-sand into the fermenting Liquor, which immediately raises it in-

FERMENTATION *explain'd.* 17.

to a sort of effervescence, and sets it forward without any other help. The reason of which appears to be this, that the saline particles of the Sea-water, which adhere to the Sand, being dissolved, divide and break the cohesion of the sulphureous particles (with which the Sugar-canes abound) into smaller particles, by which means the internal Air, which is exceedingly rarify'd in these hot countries, finds an opportunity to get loose and expand it self, upon which all the contained particles in the fluid will be exceedingly agitated, and thereby attenuated, broken, and subtilized; the continual and alternate succussions of the internal and external Air greatly promoting the extricating of the spirituous and volatile particles from the more tenacious and grosser parts. The time of Fermentation required there, being longer than is allowed in our climate, greatly contributes towards the exaltation of the principles and perfection of the subject, which is allowed to be a much finer product than what can be obtained here, tho' attempted with the same materials. And this doubtless in great measure farther arises from the newness and richness of the Molosses, which is drain'd from the new-made Sugar into large Cisterns placed on purpose to receive it, and chiefly consists of the sulphureous and oily particles (conjoined with a portion of the other principles) of the subject, which will not readily mix in a body with the rest, and turn into Sugar. And this is proved from the difficulty and time required in Fermentation to fit it for a vinous substance. For of all the elementary principles, the oily are the longest in changing their form, and the more they abound, the difficulter still it is to accomplish our design; and therefore several subjects which superabound herewith, can hardly or scarce at all by any means be brought to ferment. And, that this is

somewhat our case here, need not to be doubted, when we consider, that after all the tedious and long preparations required to perfect it, yet is the same evident and perceptible enough in that Spirit extracted from it, which we call Rum, the oiliness it leaves in the Glass (and which is look'd upon as a criterion of its goodness) confirming what we have advanced; which thing (amongst others hereafter to be mention'd) if duly consider'd, will be found to be one of the chief causes of that peculiar taste it bears, which is so different from what is produced in our own countrey; the changes which the Molasses undergoes in the several boilings and depurations for its refinement at the Sugar-houses, must indisputably exceedingly alter its taste and flavour, as Malt-spirits often rectified lose their disagreeable and nauseous taste, and become each time more pleasant and agreeable than before. And this holds true here, for that peculiar and desirable flavour which Rum affords, is partly deriv'd from the aforesaid causes, and partly owing to the Empyreuma deriv'd from the Still, as shall immediately be made manifest.



PROCESS

PROCESS II.

Shewing the method of distilling Low-Wines into a rectify'd Spirit, call'd Rum.



THE Low-Wines above describ'd having lain in a convenient Vessel close cover'd up, for about a month's space, 'till they begin to taste a little acid or sourish (at which time they are at their height, and if distill'd sooner, or suffer'd to lie longer, would lose in Spirits) are then to be committed to the Still, with one handful or two of common (orobay) Salt, to which some add a handful of Grains (in order to give a greater pungency to the Spirit) The Junctures being well secured, you are with a slow and equal Fire (especially at the first) to draw off as long as the Spirit will fire or burn on the Still-head with a lighted Paper, and the Spirit so drawn off must be reserv'd in well-season'd Vessels for use.

These Low-Wines in the *West-Indies* are kept their due time in a square Vat or Cistern, made like a Pit wherein Tanners season their Leather in the Earth, whereto a Trap-door is exactly accommodated, so as totally to prohibit the entrance of the Air, and likewise the flying away of the internal Spirits contain'd in the Liquor. The reason I assign for their lying so long (as it were buried under ground) is that they may meliorate or ripen, the first process having not as yet wholly subdued the sulphureous or oily particles; and

thus they are suffer'd to rest, till the tartarous or saline parts are in like manner exalted, and so far blended with the former, as to become a volatile, sulphureous, saline, subacid Liquor. This is in a great measure proved by the example of all vinous Liquors, which are strong and rich in proportion to the quantity of Tartar they abound with, and the more they deposite or throw off of this essential Salt, the more oily and soft they become, and if committed to Distillation, would not yield near the quantity of inflammable Spirits they would have done before. Thus common experience testifies, that Rhenish Wine, which very much abounds with Tartar, will by Distillation afford more Brandy, than the Spanish sweet Wines will do. And hence we conceive, that the essential Salt of the Indian Case in this space of time is become more subtil and volatilized, having absorbed in some measure the former, and would degenerate into an acetous substance as appears by the taste, if let alone; and therefore as soon as its tendency that way is discoverable, they immediately cast it into the Still, as a time most proper to obtain the greatest quantity of Spirits from it; for if suffer'd to rest longer, the acidity would wholly destroy the sulphureous and inflammable spirituous substance, and therefore would afford nothing of that kind; and on the other hand if committed sooner to Distillation, the essential salt not being sufficiently volatiliz'd, whereon the pungency doth in a great measure depend, it wou'd come over less piercing and fiery, and also in smaller Quantity. For to obtain a spirituous fluid in its due perfection, it is absolutely requisite that the essential Salt and Oil of the vegetable should be duly attenuated and volatilized, so as by Distillation to be reduced into one homogeneous, similar liquid substance, called Spirit. These things

things being premised in order to shew the usefulness and necessity of Low-Wines being suffered to lie till they acquire a tartish or sub-acid taste, I shall next proceed in my enquiries concerning the aforesaid peculiar flavour in Rum, which (how desirable soever it may be to some persons) may in a great measure (as I before observed) be attributed to the Still; for if you observe it carefully, it will be found no more than a common empyreumatick taste, or as we may say, a smatch of the burnt faeces: And this I am likewise confirm'd in by several reasons; the chief of which are, that as the Stills made use of for this work are exceeding large, and wholly committed to the care of the Negroes (and an overseer as idle as themselves,) they frequently want that due cleansing and washing out after every Process they ought to have; which here perhaps is neglected for a whole distilling season, and as nothing is more viscous and adhesive than Molosses, it cannot be expected but that a great quantity of the grosser matter must adhere to the sides and bottom of the Still, and consequently burn thereto; as 'tis common to all Stills, when not duly cleans'd, to have a cake of burnt faeces sticking to 'em. Another fault which may likewise produce this effect, is the charging their Stills with the Low-Wines, or Treacle-Wash, perhaps a day or two, but at least the night before they put Fire under for Distillation, during which time the Liquor (and more especially the Wash) hath leisure to deposite its grosser and heavier parts to the bottom and sides of the Still, which hardens as the Fire encreases, and consequently sends over with the Spirit the sulphureous or oily particles inherent in the burnt matter, which communicates that particular empyreumatical flavour to the distill'd Liquor. This I hold to be the principle and cause of the afore-

said taste and smell so peculiar to this subject. And if the like method was put in practice in our own countrey, I make no doubt but we should come very near to the original, if not exactly copy it; the effects arising from the newness of the Molosses only excepted; which if put into the balance, I am inclined to believe will be found light in comparison of the other. And therefore he that desires to obtain Rum, as near the genuine as this our climate will allow, must not stand too much upon Niceties, but must make use of the Negro's practice, and then he will have a fair chance of obtaining that particular taste, which arises from the adust (or burnt) oily exhalations commixing with the Spirits. But enough of this. He that desires farther Information, and how to obtain it at a much cheaper rate, than ever was heard of amongst us, I must for brevity sake, remit to the Island of *Barbadoes*, where he will be taught good husbandry, and a method of extracting this *West-Indian Cordial* at as low a price as his heart can wish. But this is best pass'd over in silence. I shall now proceed to the next thing that naturally falls under our consideration, which is that of Molosses Spirit; but as there is little difference in the way of preparation betwixt this and the former, being both raised from the same materials, I should have waved the description of it, as a subject belonging peculiarly to the Distiller's art, had I not lately met with a prescription amongst my writings, from which I once for curiosity (and instruction sake partly) made the experiment after this manner.

PROCESS

phlegm, and consequently make the Spirit rise in larger quantity, and be better tasted, and caps



and should work slowly thro' the

PROCESS III.

*Teaching how to extract a vinous and
Spirituos Liquor from Molasses,
Sugar, &c.*



Take twelve gallons of Liquor (as Rain or River-water) boiled and suffer'd to stand, till it be just blood-warm; add twenty eight pound of Molasses, (*viz.* Treacle or coarse Sugar) beat them up very well together, for near half an hour, or till the Treacle &c. is all dissolved; then put in a sufficient quantity of new Ale-yeast; mix all well together, and cover the Liquor up close; and as it works up, beat it down again three or four times a day, till the Fermentation begin to cease or flatten; then commit it to Distillation after the same manner as is directed in the first process, filling your Still scarce above half full, and with a gentle Fire draw off your Low-wines, till they begin to taste a little sourish, shift your Still, and lay by your Low-wines in a Vessel close cover'd up for nine or ten days, or longer in Winter, till they acquire a tartish taste, and then you may proceed to the Distillation of the Proof-Spirit, which is to be managed in all respects as in the second process of distilling Low-wines for Rum, only observing not to draw it below proof, as being a good commodity, which will enrich it self by keeping; and here it may not be amiss to add one or two pounds of Raisin Stalks, with a handful of Bay-salt to the second Distillation, which will keep down the

24 The NATURE of

phlegm, and consequently make the Spirit rise in larger quantity, and be better tasted, and capable of great improvements by art.

Note, that if it should work slowly thro' the viscidty or clamminess of the fermenting Liquor, or coldness of the season, a few live Coals or new-made Wood-ashes will remedy that inconvenience, by dissolving the oleaginous particles, and separating them asunder, the alkaline Salt in the Ashes being excellently adapted for this purpose. The same effect will be produc'd by an Onion dipp'd in strong Mustard, or a Ball made of quick Lime, Wheat Flower, and the White of an Egg beat up into a Paste, a piece of which being thrown in will occasion a new Fermentation: But these last are only to be used, when you are sure this defect proceeds solely from the thickness of the liquor, for otherwise these volatile and fiery saline substances will so break and divide the texture of the fluid, that with themselves they will make way for all the contained spirituous particles to fly off at the surface, as is sufficiently evident from experiments of a like nature. Thus Scurvy-grass, Horse-radish root, &c. which abound with a very pungent volatile Salt, when put into fermenting Liquors, tho' rais'd to the highest head, the flowers will immediately cause them to subside and from thenceforth cease working. For the volatile saline particles, continually exhaling from 'em, in their passage upwards will burst asunder the aerial vesicles, or blisters, which swim upon the top of the Liquor: whereupon a subsidence and flattening of the Liquor must of necessity ensue: And therefore where your subject is poor and thin, these attenuating subtil bodies are by no means to be made use of, but on the other hand you are to add more Molasses, Sugar, &c. with a portion of good Ale-yeast to give it a greater body.

body. The lees of Ale will also enrich it and thereby promote its Fermentation: But when it is too much replenish'd with vegetable juices, those sharp stimulating compositions may be advantageously made use of. Farther, when the Liquor is of a thin substance, and abounds with many subtil and very fugitive particles, something of a viscid and gross consistence must be used to bridle and restrain their too great activity; to which end the White of an Egg and Wheat-flower, old Yeast and a cool position, are very serviceable. What I have here laid down I hope will be excused, as it teaches all that is requisite to be known for promoting the business of Fermentation, the knowledge of which is absolutely necessary for the right treatment of all vegetable subjects that fall under this consideration.

Here usually arises a controversy, whether the Barm or Flowers are to be put into the Still with the Fermenting Wash. Several Practitioners plead strongly for it, and others as strenuously against it. The former urge its fermentative quality, and that a large proportion of subtil spirituous particles are contained in it, and consequently that from thence a portion of inflammable Spirit may be procured, and therefore advise to throw all into the Still together when the Liquor is in its highest curl, and proceed forthwith to Distillation. The latter observe, that whilst it ferments and swells in the Still (when urged by the heat of the Fire) it very often boils up into the head, and thereby endangers its blowing up, (unless kept down by a great weight,) by which means great damage must arise; or at least that it comes over foul into the Worm, and thereby spoils the clean Distill'd Spirits; and therefore they reject it as useless, or at least not worth the trouble and peril it may occasion; and thus they

skim

skim clean their Backs, before the Yeast falls down to the bottom. But these reasonings may easily be reconciled; for if, when the Fermentation is pretty far advanced, and the Flowers begin spontaneously to subside, the Liquor should then be suffer'd to stand in the Back, or other Vessel close cover'd up, till it become of a subacid taste, or a medium between sweet and soure, (at which time it may be said to have imbibed or fed upon its own Lees,) and then be committed to Distillation (the Still being half fill'd therewith) it would afford far more Spirit than if used either of the foremention'd ways. And this may be proved by the common experiment of distilling the Lees of Ale, Beer, or Wine, by the good Women, who without any preparation distill off a tolerable and well tasted Spirit from them; which in my opinion might be done to far greater advantage, if the same were first dissolved or diluted with a sufficient quantity of warm Water, and then with common Ferment set a working for some days. For this process might probably afford a Spirit in greater quantity, as it loosens the texture of the Faces, which I look upon as too compact and viscid to yield all their volatile and spirituous parts, without undergoing this previous preparation. But this I refer to every one's judgment and discretion, which will best direct him after due proof made hereof; for I cannot suppose that it will ever be comply'd with by the wholesale Distillers, whose ready vent for their Goods will not allow them such a space of time as is proposed for the Liquor to become of a tartish taste, and therefore they are obliged immediately after Fermentation to commit the Wash to the Still (the Backs working all the while;) but for those who have not so ready a demand, or only make it for their own use, I am perswaded, they will find their

account

FERMENTATION *explain'd.* 27

account in following the proposed method. To conclude, I have often wonder'd at the practice of fermenting all Molosses and Malt-wash, without any previous boiling; whether the length of time requir'd to boil 'em, and greater apparatus of Vessels, or the fear of the exhalation and waste of Spirits has occasion'd it, I cannot tell. As to the first, there may be an appearance of reason in it; but for the latter, it is certain that the Liquor can lose none of its best parts by boiling, (before Fermentation) for it is that alone which sets loose its active particles, and before that hath been pre-mised, were it to be boiled never so long, not the smallest portion of Spirits would be lost by it. As for Example, fill a Still half full of the best and strongest Wort that can be brew'd from Malt, or Wash drawn from Molosses, boil them in the Still (unfermented) with the head on, and you shall find that what descends thro' the Worm, will be only an insipid phlegm, destitute of all the distinguishing qualities of an inflammable Spirit; and this makes good the positions which I have advanc'd. Therefore I should advise all those who have opportunity and conveniency of utensils, especially Apothecaries and others, who would make any quantity for their own use, to boil up their Wort to a due consistence, as the Brewers do their Beer and Ale, by which means it will become stronger and of a better body, and being suffer'd to cool, it may be put into a proper Vessel with a due quantity of Ale-yeast, and there suffer'd to ferment, beating it in as it rises up, till it cease of its own accord; and it will hereby yield more Spirits than if unboil'd, or not duly fermented; from which last circumstance, the nauseous and disagreeable flavour so often perceptible in common Malt-Spirits frequently arises.

PROCESS

PROCESS IV.

Delivering the method of preparing the Wash for Low-wines, and drawing from thence an inflammable Spirit, extracted from Grain or Corn malted.

UPON a quarter of ground Malt (more or less, according to the size and magnitude of your Wash-backs) pour as much scalding hot Rain-water or River-water (the Malt being first put into your Mash-vat or Tub) as will well wash it, or make it of a consistence like to a thin pap; stir it very well together, till all the Malt be thoroughly wet and mix'd with the hot Water, then cover it close up (some farther sprinkle the top of the Mash over with dry Malt ground;) let it stand two full hours, or somewhat longer, that the Liquor may be fully saturated and impregnated with the powers or principles of the Grain or Malt, then let it run off from the husks; and if there be any virtue or strength left, which may be perceived by the sweetness of the Grains, pour on more hot Water, and let it stand in infusion as before, till it be fit to be drawn off; then mixing the Wort together, put 'em into the Mash-backs to ferment with a due portion of Ale-yeast, and let 'em stand there two or three days, keeping the Liquor down from working over the Backs, by often beating it in; and then use your pleasure either to skim off the Barm, or let it go with the Wash into the Still; fill half your Still with it (observing to keep the

Back

Back working all the while) lute close the junctures, and with a moderate and equal Fire at the first, draw off two or three Canns, which will be very spirituous, and then proceed with a somewhat stronger Fire to draw off the rest. These Low-wines must, like the foregoing, be kept in a Vessel close covered for nine or ten days, and then may be drawn off over again, till what comes over ceases to take fire from a lighted Paper. If you would have them rectified full-proof Spirits, you must draw over a third time with the addition of Raisin-stalks and a little Bay-salt, Salt of Tartar or Flemish Pot-ashes thrown into the Still; as is taught at large in the first part of this book. If your Wash was well fermented, you might procure from the aforesaid quantity of Malt about three Barrels of Wash, the product of which in Low-wines would amount to near thirty seven or thirty eight gallons, and from thence would yield about fourteen gallons, or rather more, of proof Spirits. The remarks which here occur are so near akin to the foregoing, that what has been said already upon this head, may very well suffice for this Place. I shall only observe (in answer to * some Queries sent me) that the opening the body of any Grain, as Barley, Wheat, Beans, Rape, &c. is perform'd by the Maltster's art,

* The following Queries were sent to me by some Person unknown. "How to open the Body of any Grain, as Malt, Rape, Molasses, coarse Sugar, &c. What quantity of Water is put to a quantity of any of the aforesaid, and how long time they will take to ferment? And as several things are used to forward Fermentation, what is proper beside Yeast, and in what Proportion to be used? As likewise, what quantity of Spirit in the first Distillation such a quantity of fermented Liquor will yield? This being the ground-work of all Distillation, if it is fully explain'd in the next edition, that Work will then better claim the title of a *complete Body of Distilling.*

who as the learned Dr. *Willis* informs us, first steep's those vegetable products in river, or common, Water for three days, until it be render'd soft and tumid, then the Water is to be drained off, and the Barley to be removed from its wet Couch to a dry Floor, where it is laid upon a heap, stirring it twice or thrice a day, least it should grow too hot. In this state it is kept till it begin to bud or sprout; afterward its further growth is prevented by throwing the Couch a-broad into shallower Beds, frequently turning and spreading it thin over the surface of a large floor, in order to dry it thoroughly, and consume all the superfluous moisture; lastly, the process is finished by drying it and crisping it on the Kiln by the help of the Fire, which being ground, yields a wonderful sweet Meal or Malt.

Thus our Author shews us the process of opening the body of any Grain or Pulse; which is built upon the following reasons: *First*, the Barley is steep'd in Water, in order to plump it, and rouse up the active principles, or vegetative spirit of the Seed. *Secondly*, it is thrown into moderate heaps or couches, that by the heat or warmth thence arising (as 'tis common to all moist bodies, when accumulated, to acquire a putrefactive heat) the foresaid elementary principles may dilate and expand themselves: And like as the internal *Aura* of mixt bodies, when rarify'd by heat, seeks for a passage thro' the pores to extricate itself; even so here, those active little bodies thus put in motion force open their containing *Capsulae*, and begin to shew themselves in form of a bud or sprout; but lest they should exhale away or fly off from the subject, a Stop is put thereto, by drying and hardening it, first upon a large open Floor expos'd to the Air and Wind, and lastly, by the additional heat of the Kiln; all which is intended wholly to

to consume the moisture, which gave birth to the vegetating or germinating faculty; and hereby a stop is put to their further growth or action, until they come to be wet again in the Mash-vat, and by means of Fermentation are exalted to their utmost state of perfection or volatility; by which means we obtain a very grateful and pleasant vinous Liquor.

The first Query being thus answer'd, the rest are easily accounted for. I shall therefore proceed to shew next in what manner to prepare some compound Cordial Waters, and go on to lay down the method of making some artificial Wines; which shall finish this undertaking.

Aqua vite.

TAKE Cubebs, Cinamon, Galangal, Nutmegs, Cloves, Ginger, of each three ounces; Sage, one pound and two ounces; macerate all these in six gallons of Proof-spirit; to which add a sufficient quantity of Water, and draw off with a gentle Fire, till you see the Faints appear: Dulcify with a sufficient quantity of Loaf-Sugar, according as your palate and judgment shall direct you.

The original prescription, which we have from *Gesner* and *Rantzovius*, orders only as much Spirit as the weight of all the ingredients amounts to, which will scarce be sufficient to moisten them. And therefore I have altered it to six gallons, which is as little as can be used for thirty six ounces of ingredients. This Cordial Water was in great esteem (as the aforesaid Authors inform us) with *M. Gallus* Physician to the Emperor *Charles* the Fifth. By the use of which he is reported to have lived one hundred and twenty four years,

years, saith *Gesner*, and one hundred and twenty nine according to *Rantzenius*. Whether either of them be in the right is not material; their joint consent as to its virtues is sufficient to establish a good opinion of it; the latter dignify'd it with the pompous title of *Aqua vite*, *Vitam prolongans*, upon the account of its efficacy in prolonging the life of the aforesaid Emperor's Physician, which taken as a Cordial very probably might contribute to invigorate and rouse his Spirits, when the spark of life begun to fail, and the circulation of the juices grew languid; a dram of this Cordial Water taken in any convenient vehicle, would in this case immediately restore the depressed state of the spirits, and recruit all the animal functions as it were in a moment; the aromack *Effluvia* arising from the rich essential Oils of the ingredients (wherewith they very much abound) when received into the body, will immediately insinuate themselves, not only into the more open passages, but likewise even into the inmost recesses of the nerves, where by virtue of their attenuating and stimulating faculty, they will rarifie and dissolve any viscid or gross matter, which might infarctate or obstruct their minute pores or passages, and further, at the same time, irritate the fibres to throw off the adhering lentor which might load or oppress them; and by thus opening a passage for the nervous fluids, and likewise bracing up the *fibrillæ* of the solids, they may truly be said to rouse the spirits, and impart a brisk motion to those subtil bodies; from whence must consequently arise a proportionate vivacity of mind, as well as activity and agility of body; especially in all cases arising from a cold cause or decay of the natural heat. But in a contrary habit they will have as contrary an effect, by adding oil to the flame, which is ready to burst out to the de-

struction

struction of the whole animal oeconomy. This Water may be used in all cases (and with as good success) as the *Aqua Mirabilis*, or Dr. Stephens's of the Shops. 'Tis as pleasant to the palate, and as serviceable in Medicine, being a very good cephalick and stomachick Cordial Liquor; and seems to me to have given rise to the other two.

Another.

TAKE of the best Cinnamon one ounce and an half, white Ginger three drachms, Cloves and Nutmegs of each half a drachm, grains of Paradise two scruples, black Pepper one scruple, powder them grossly, and infuse them for six days in one gallon of Proof Spirits, then put them into your Still with a sufficient Quantity of River-Water, lute well the Junctures, and with a moderate Fire draw off for use.

This Compound Cordial Water is likewise made by infusing the aforesaid Ingredients in a sufficient quantity of *French Brandy*, which may be aromatized (for those who can bear Perfumes) with a little Musk and Ambergreese tied up in a Rag, and suspended in the Bottle; and edulcorated with Loaf-Sugar, or Syrup of Citrons, as *Lucas Ghinus* orders in his prescription; or with the *Julapium Rosatum* according to *Heurnius*, who gives us an elegant description of its virtues and excellency in the preservation of health and prolongation of Life, from *Jo. Michael Savanarola*, an excellent *Paduan* Physician, who relates that *Antonius Scarperia*, a Physician of great note, with *Jacobus Parmensis*, another of the same faculty and a Nobleman of *Mantua*, with the aforesaid *M. Gallus* and some others, supposed their lives to be prolonged by the salutary effects of this Cordial Water, moderately taken in their old age; to which *Hieronimus Rubens*, a learned Physician,

gives his Assent. The particular virtues of it we have from the above-mention'd authors, who tell us, that it resists putrefaction, promotes concoction, and recreates the Vital Spirits with an unusual Vivacity, that it comforts the Head and Brain, by stirring up the natural heat to strengthen the memory, and preserve the mechanism from sinking under an apoplexy, as *Lucas Gbinius* well observes, in the Enumeration of the virtues of his *Aqua Vitæ Aurea*; the description of which may perhaps not prove altogether unacceptable to some persons, and is as follows.

Aq. Vitæ Aurea.

℞ Cinnam. Elect. ℥x. Lign. Aloes ℥v. Cardamom. Cubeb. Caryophyl. ana ℥iiij. Galang. ℥iii. Santal. Citrin. ℥iij. Flor. Rosar. Rubr. Sicc. ℥iij. Nuc. Mosch. Macis ana ℥ss. (Mosch. ℥i. Ambergr. gr. 40) Aq. Vitæ Simpl. ℔xii. Syr. Cort. Citr. Miv. Cydon. ana ℔i. Pulveriz. & misceantur in vitro optime obturato, agitando quotidie bis terve, & cum per mensem sic steterint, coletur & servetur ad usum.

There can be no Fault found with this composition, except its dearness, which is much increased by the perfumes; and these may very well be omitted for some constitutions, the residue of the ingredients being sufficient to aromatize it with a grateful flavour. The virtues our author assigns to it, are much the same with the foregoing, and as he concludes, 'tis an excellent remedy against all cold diseases; but in hot and bilious temperaments, and all inflammatory or febrile disorders, where the circulation is præternaturally augmented by some accidental cause, or to persons subject thereto upon any slight and trivial occasion, as most young persons are, the use of these hot Liquors is wholly to be forbidden. For

FERMENTATION *explain'd.* 35

it deserves to be observed, that the aforesaid Physicians, &c. who used this Liquor with so much benefit to their healths, only begun the use of it about the 80th or 90th year of their age, when the animal faculties begun to flag, and nature crav'd the assistance of some generous Cordial, to rouse up the Spirits and disperse the Crudities which might oppress them: To which intention, these compositions seem to be excellently adapted, if taken in Wine or diluted with any other convenient vehicle, which was the method used by their authors or composers. *Heurnius* is very sparing in the dose, allowing only a few drops to be taken in a glass of Wine, which makes it as good as *Hypocras*, and that with far less labour, and expence of time, than is required for the composition of that once celebrated medicinal Wine; a prescription for the making of which I shall borrow from *Conrad Gesner*, an author of great credit, who in his *Euonymus* delivers us this Process.

Hypocras, or Hypocratic Wine.

TAKE Cinnamon one ounce, Cloves one drachm and an half, Anniseed and Fennel seed, of each one drachm; Liquorish three drachms; Mace, Cardamoms and Orrice-root, each half a drachm; Loaf-Sugar three ounces; bruise the Spices and Seeds in a Mortar, and slice the Liquorish, and pour upon 'em nine ounces of Malmsey (or strong Mountain white Wine) and a pint of Borrage-Water, three ounces of Balm-Water, and one ounce and a half of Rose-Water. Infuse them in a Matraass (or other convenient Vessel) in a moderate heat for three hours, then run the Liquor through the flannel Slieve, or filter-Paper for use.

'Tis very profitable for diseases of the Lungs and Thorax, as saith our Author. We meet with another prescription of the said author's, wholly made with Wine, and therefore perhaps may be more acceptable. Which is thus:

℞ Cinnamon one ounce, Ginger half an ounce, Galangals and grains of Paradise each two drachms, Cloves one drachm, double refined Sugar half a pound, best Wine as much as is sufficient, and with a due portion of Almond-Milk, clarify and strain it through a thick Flannel until it be fine, and then bottle it for use. This hint I find is taken notice of by others, who in the composition of this Wine, add a portion of new Milk to it in lieu of the *Lac Amygdalarum Dulc.* prescribed by our author, with the juice of a Lemon, in order to depurate it or fine it sooner. By which artifice *Hypocras* becomes much mellowed and better tasted. It is a pleasant Cordial very grateful to the Stomach, strengthening its relaxed tone, and bracing up the fibres to their due and natural tensity, when vitiated by surfeits or debauches; and may be much better trusted to, in several cases, than the heating stomachick Tinctures infused in Brandy, used in Coffee-houses &c. upon the like occasions.

An Alexipharmick Cinnamon-water.

TAKE Cinnamon one pound, Citron-peel four ounces, tops of Balm one handful, Angelica-seed half an ounce, Proof-spirits three gallons, River-water two gallons, mix and distil according to art.

This is a pleasant compound Cinnamon-water, which may either be dulcified with double refined Loaf-Sugar, dissolved in a sufficient quantity of Rose-

FERMENTATION *explain'd.* 37

Rose-water, when you put up the goods into your Cask, or only *pro re nata*, as occasion calls for it. Its aromatick flavour wonderfully recommends it to the sensitive organs, cherishing and restoring the decays of nature, when suffering under the burthen of old age, chronical distempers, grief or trouble of mind, or any other calamity of the like nature; and in my opinion is equal, if not preferable to that small Cinnamon-water of *Matthiolus* (drawn from Cretan-wine and Rose-water, each four pound to one pound of Cinnamon) which he loads with such commendations; and with him we may say, that it corroborates all the principal Viscera, as the Heart, Brain, Stomach, Spleen, Liver, Lungs, and Nerves themselves, thereby strengthening all the animal functions, and may very well be allowed to merit the appellation of an Alexipharmick, if what our ancient and well experienced Botanist (*Gerrard*) saith of the Citron be true, whose credit I shall not call in question.

Our Compound Poppy-water.

TAKE of Proof-spirits two gallons, red Poppies as many as the Spirits will well contain, or thoroughly moisten: Set them in a glass body placed in the Sun for two or three days, then add thereto Raisins sliced half a pound, Liquorish and Figs cut in pieces of each four ounces, Cardamoms, Cubebs, Coriander-seed each two drachms, Nutmegs and Mace each one drachm, bruise the Spices, and put them into your Still with one gallon and a half of common Water, lute the junctures, and with a gentle Fire distill off your Goods till the faints appear, put your Distill'd Liquor into a wide-mouth'd Glass Vessel, to which

add fresh red Poppy-flowers four handfuls, Cinnamon two drachms, Nutmegs and Mace of each one drachm, Citron-peel half an ounce, white Sugar one pound, dissolved in one quart of Rose-water, let them infuse for two or three days more, then strain off the Liquor and run it through your Filter, or flannel Bag for use.

This is a very beautiful and well tasted medicinal Water, serviceable upon many occasions; the Liquorish and Figs, although mucilaginous bodies, and as such may seem very unlikely to send over any remarkable virtue in Distillation, do yet impart a softness and smoothness to the distill'd Liquor, as experience sufficiently testifies; for those Liquors, into which such bodies enter, do always taste milder upon the palate than others wherein they are wanting; upon which account it hath been usual to add them to Citron-water and other rich Cordial Drams, to obtund the acrimony and heat of the new distilled Goods, whereby they meliorate sooner, and acquire a rich flavour. And upon this view, (not being unapprized of these objections) I chose to commit them to Distillation, in order to contemperate the fiery heat of the Water, and render it fitter for internal use: The Poppies (wherein the chief medicinal qualities of the compound consist) recommend its use in several diseases of the Chest or Thorax (if discreetly given) and is the only Cordial Water wherein an anodyne quality presides. The excellent specifick property of that vegetable in inflammations of the Pleura and Lungs, hath introduced its use in all pleuritical disorders, as likewise in other inflammatory cases; for as *Etmuller* well observes, it wonderfully dissolves the grumous blood, and therefore in his comment upon *Schroder*, he advises the use of these Flowers in a Pleurisy, Quinsy, Erysipelas, &c. as do several

veral other able practitioners. But as acute and fatal distempers do not admit of time to be trifled away upon fruitless experiments; far be it from me to recommend the use of spirituous Cordial Liquors in such cases, and especially in the hands or direction of those who are not duly qualified for the business. I shall rather exhort them to desist and give way to others, whose judgments and qualifications will be their sufficient warrant, and in whose hands it may be found of service both as an anodyne and as a dissolvent, when diluted with some proper Vehicle, such as the Simple Distill'd Water of red Poppy-flowers, &c. whose efficacy in composing rest without inducing any bad symptoms, hath been often experimented to transcend all the famed Opiats of the Shops: But enough of this. Its other virtues are, that as a Cordial Dram it corrects the crudities and laxities of the ventricle by virtue of the warm Spices contain'd in it, and consequently promotes digestion; from whence it hath taken the denomination of a Surfeit-water, a title which some have given it from its salutary effects; and in a word it cheers the drooping spirits, invigorates the whole system for a season, and afterwards induces a pleasant and quiet sleep, acting the part of a good Cordial, without leaving any harm behind it.

Claret or Nectar.

TAKE of Cinnamon six drachms, white Ginger half an ounce, Cloves three drachms, Nutmegs two drachms, Mace and Cardamoms of each half a drachm, Coriander-seed a drachm and a half, white Sugar one pound, best Wine four pints, mix them all well together, and let them stand in a convenient Vessel close covered up for

two days. Then press out all the Liquor from the Ingredients, and by often running it through the Flannel-bag, fine it to a beautiful transparent colour; and if you would have it very rich, a little Musk and Lignum-aloes rasped, and hung in the Vessel (tied up in a nodule of scarlet Silk) will aromatize it with a very rich and delicious flavour, and for beauty's sake a few leaves of Gold may be lightly broke in it.

This prescription I have selected from *Gesner*, as being the most simple and best adapted composition I could meet with, amongst the great variety that learned author hath produced in his book of secret remedies: Some of which are prepared with Honey in lieu of Sugar, and clarified with the White of an Egg (for vulgar persons) which I have rejected, upon the account of the taste, and also of the colour, which are render'd more disagreeable hereby. This medicated Wine, which our author dignifies with the pompous title of Nectar, is somewhat akin to the *Vinum Hypocriticum* aforegoing, but somewhat more warming and stomachick, as its composition plainly denotes; it corrects all crudities and disorders of the first passages, discusses flatu's and cructations of Wind, and by invigorating the fibres with a fresh supply of Spirits, and the grateful sensation communicated to the whole nervous system, all languor or faintness is instantaneously removed; the nervous fibrillæ having recovered their tone are enabled to shake off whatsoever is oppressive and offensive to them. Hence proceeds that chearfulness of mind and agility of body, which usually is so perceptible after a moderate dose of any cordial or spirituous Liquor; whose effects are so immediate and quick, that we cannot suppose the same to have run the long course of circulation with the chyle and blood, and therewith to have under-

undergone the several transmutations and secretions requisite for the perfection of such a noble fluid as the animal spirits are; but rather that they take a much shorter course, as by the very nerves themselves, or their fibrillæ, through whole minute orifices very probably they are imbibed or sucked in, which being replete herewith, they perform more forcibly their usual vibrations or undulatory motions (stimulated hereto by the volatile particles of the ingredients) to discharge and throw off any pituitous or viscid Lympha, which might obstruct, adhere to, or otherways oppress them. And hence, in faintings, swoonings and other dangerous and sudden prostration of the forces, arising from what cause soever, Cordial medicaments of a Liquid form, are always most eligible and preferable to those of a more solid and compact substance.

Spirit of Clary.

TAKE Leaves of fresh Clary gathered in its prime three or four pound; bruise it or cut it small, then put it into a wooden Vessel with as much warm Water as will just cover it, let it stand for three or four days, then commit it to the Still, and with a due degree of heat, bring off all the Water as long as it hath any taste of the subject. Then knock off your Still-head, and press out the Liquor which remains in the copper body, and with the Distill'd Water pour it upon a like quantity of fresh Clary bruised as before: Then (having clean'd your Alembick from the remains of the aforesaid distill'd plant) put them altogether into the Still (or any other suitable Vessel) and let them infuse for four or five days longer, in order to extract the whole virtue of the plant,

plant; which being perfected, add thereto one gallon of rectified Proof-spirits, lute close the junctures of the head, and refrigeratory, and with a moderate and equal Fire draw off all the clean Proof-spirits, reserving the faints or after-runings apart, for another Distillation.

By this method of infusing the plant a sufficient time in warm Water, the texture of it is loosen'd, and its body prepared to emit its principles in Distillation. But that we may obtain all its qualities in greater perfection; the Distill'd Water, and Liquor left in the bottom of the Still, are affused (in lieu of common Water) upon fresh Clary, and committed likewise to a second digestion. By which cohobation and reiterated infusion, the Liquor becomes wholly saturated with the principles of the vegetable; which if then distill'd without any spirituous substance (to imbibe the oily particles) would come over thick and unctuous, as being not sufficiently broken and subtiliz'd by a previous Fermentation; to obviate which inconveniency, we add a due quantity of Spirit of Wine, in order to attract or suck up the Oil (wherewith it readily unites and commixes) and carries it over the helm in form of Spirit, enriched with all the essential principles of the ingredient or vegetable, as much as if it had suffer'd a Fermentation; which, seeing that this Spirit partakes of many singular and even uncommon virtues, in altering the taste and flavour of many fermented Liquors, to a far richer and more noble nature, as hereafter shall be shewn, I shall exhibit one process more of preparing this Spirit by means of Fermentation, leaving the Artist to take his choice of that which pleases him best.

Spirit

Spirit of Clary by Fermentation.

TAKE what quantity you please of fresh Clary gather'd in its full prime, bruise it well, or cut it into small pieces, and put it into a wooden Vessel (placed near the Fire) then pour upon it about twelve times its own quantity of River-water made warm, with a sufficient quantity of Sugar, (*viz.* about two pound to every gallon of Liquor) stir 'em all very well together, then cover up the Vessel, and let it stand pretty warm: If the Fermentation proceed well, which may be known by the continual hissing noise of the Liquor, with a froth thrown up with the plant to the surface, you need do no more till the same be wholly compleated, which will be sooner or later according to the season of the year, and heat of the weather (which hath a particular influence in this case;) as for instance if it advanced pretty soon and kept well up, a week or ten days may be sufficient; but if otherwise a longer time is required, and it will be requisite to add a portion of Ale-yeast to promote it (and a little more Sugar if need require) placing it nearer the Fire if the Liquor feel cold: When it hath stood its due time and the Fermentation is fully compleated, and the plant subsides to the bottom, you are to commit this vinous Liquor to the Still, half filling the same herewith and proceeding in all respects as before directed, drawing off the Liquor as long as you can perceive any taste of the Spirit, and that it remains clear, and free from an Emphyreuma or other disagreeable flavour (if the first runnings appear clean, limpid and very spirituous, reserve them apart for your use.) But it is seldom that the Fermentation is so perfect

fect and compleat, as to afford any quantity this way, that is fit for keeping any time; and therefore it will be absolutely necessary to rectifie it over again, after your Liquor hath laid some time to enrich it self according to the method laid down in distilling low Wines; during which interval there is cause to fear, that some of the most distinguishing principles (wherein the specifick taste and smell of the plant resides) will be either lost, or at least so changed in their nature, as scarce to be discoverable from any other spirituous body, to the entire destruction of the nature of the subject. To avoid which Inconvenience I would advise, that when the Fermentation is at the height, (which must not be continued too long if this be used) to add a due portion of Spirit of Wine, or *French Brandy*, to the fermented Liquor, and then immediately to charge your Still with it, and lute it well, and with a moderate slow fire draw off the Spirit for use; which by this method will yield a larger quantity, and retain the true taste and flavour of the vegetable, from which it was extracted; tho' whether in that perfection with the preceding Process may be questioned, and experience by frequent trials must alone discover: For 'tis an undoubted truth, that the many changes which vegetable subjects undergo in Fermentation, do so alter the nature and form of the constituent principles, that very much of the genuine flavour and taste of the subject is lost thereby. Which inconveniency can only be remedied by the proposed method, which seems most likely to retain those volatile distinguishing *Effluvia* we so much desire in this composition.

Another way yet more simple and expeditious remains, which is this.

Take

Take the leaves of Clary fresh gathered, cut small or bruised, two pound (more or less according to your use) Spirit of Wine six pound, distill in a Glass-Still to dryness. Pour this distilled Spirit upon the like quantity of fresh Clary, which infuse for a night in the Still, then with a gentle fire repeat the operation as before, taking special care to avoid an *Empyreuma*. The Spirit thus obtained brings over with it all that is desirous in the subjects, and is a pleasant and fine Cordial, of a very agreeable and Citron-like flavour. *Etmuller* highly recommends it in feminine cases, as particularly in the *Fluor albus*, and hysterical suffocation: And in the cholick, he says, you'll scarce find a more excellent remedy, and even externally, it is equal to Castor in hysterick disorders. Thus our author extols its virtues in physical cases; but as the abovementioned Processes produce only a high rectified and inflammable Spirit, it cannot be taken in that form, without diluting it with some convenient vehicle. We shall therefore proceed to select some of the most pleasant that will answer this purpose. Thus were you to put one spoonful of this distilled Spirit into a glass of Cyder, Mead, Raisin-Wine, or any other artificial Wines of our own product, it would give it the true flavour of several rich foreign Wines, so that a well experienced palate shall scarce know the difference. For example, if you put two or three spoonfulls of Spirit of Clary, with a small lump of Loaf-Sugar into every bottle of Cyder; when you bottle it off, it will in a small time impart its flavour to the whole, so as not to be distinguished from true Canary-Wine. For this Spirit, *Etmuller* has observed, hath a true citron flavour, very sharp and penetrating, which exactly resembles that of Canary in taste and smell. The like effect may be produced

produced from other vinous Liquors; for if when you rack off your Raisin Wine, you add to every five gallons a quart of the aforesaid Spirit, and then let it stand for some time well stopped up, when you draw it off it will resemble Rhenish-Wine, both in taste and goodness; which you may change into Claret, by only adding about two ounces of white Argoll to the aforesaid quantity, with a quart of the juice of Bramble-berries, and one pound of Loaf-Sugar; and if you would have it strong, add one pint more of the Spirit of Clary, and it may be fined down with about two drams of Isinglass. By this method it will resemble in taste and colour the true *French* claret. But if your made Wine hath been of too weak and low a body, it will require some *French* Brandy, or more Spirit of Clary to enrich it when you barrel it; and further, if it should prove too austere or rough upon the palate, or the colour be too faint, these deficiencies may be made up, by adding more of the aforesaid juice and Sugar, until it acquire all the requisite qualifications of Claret, which will be best discovered by the experience of many trials. It may not be amiss here to observe, that of all our vegetable Products, there is none that bears the true Stypticity and austere taste of *French* Claret, so much as the fermented juice of Bramble-berries. The truth of which I learnt from an accident some years ago in preparing the syrup of this juice, which either by a mistake committed in boiling, or the want of a due quantity of Sugar, not having attained its due height or consistence, it was put up into a vessel, and there suffered to rest for a considerable time, as I remember near a twelvemonth, at which time I had an opportunity to taste it; And upon examination in a glass, I found it to bear all the true distinguishing characters of Claret,

set, as to taste, smell, strength and colour; yet not wholly relying upon my own judgment, I desired the opinion of some others, more experienced than my self, who all came in readily to my sentiments. From whence I conclude, that several Wines might be produced from our own vegetable juices, as rich and delectable as even the best of those which are imported into the kingdom, provided they had a due quantity of Sugar to enrich them, and a compleat Fermentation to exalt them, with a proportionable time or age to meliorate and fine them; the failure only arising for want of these necessary circumstances: Which may be amended at any time by adding a due quantity of any fermented proof Spirit, such as Spirit of Clary, Spirit of Cyder, or Elder-Berries (or in want of these, *French Brandy*) to the new made Wines upon drawing them off, and putting 'em up into the Barrel; and by adding a little Isinglass, white of an Egg, and Wheat-flower made up into a past, they might easily be fined down, by that time they would be fit to be racked off for bottling or drinking. This Digression I hope will be easily pardoned, when it is considered, that it lays down the true method of producing these Liquors to the best advantage, and greatest perfection that they will bear.

Spirit of Elder-Berries.

TAKE the ripe berries of Elder, press out all the juice, and put it into an open headed vessel. To every gallon add three pound of Sugar (note, that some persons boil them up together, and then let the Liquor stand till it be lukewarm) then add Yeast, and work it according

ing to the rules of Fermentation. The higher the ferment is carried, the richer the Wine will be, and consequently the Spirit the stronger, which would be yet considerably improved, if one quart of Wine-lees were added to the said quantity of fermenting Wine. When the operation is over, (which sometimes lasts ten or twelve days) what you design for Wine, tun up in a cask, with Isinglass, in order to fine it; and when it hath age, rack it off, and bottle it with a little Loaf-Sugar, and one spoonful of its own Spirit to every quart. And thus you have Elder-Wine made in its greatest perfection, which may serve as a model to prepare all other Wines from ripe succulent fruits or berries. But if you desire to obtain a Spirit from it, you must take the Liquor as soon as the Fermentation is over, and proceed to a distillation of it in an alembick, with a moderate fire, till it begin to taste sourish, and of the sæces. Reserve this distilled low Spirit in a vessel well closed up for about a fortnight longer, and rectifie it over again according to art.

Note, that a Glass-Still is more proper than a Copper-Alembick for this last Distillation. Likewise the aforesaid Elder Wine, when grown prickt, or sourish, and thereby unfit for drinking, may be distilled in a Copper Vesica with its refrigeratory (or Worm running through cold Water) after the same manner as taught before; rectifying it over again into a high proof Spirit, and reserving the after runnings as long as they come clear and limpid, under the denomination of Elder Water, serviceable for many physical uses: By this method you will obtain a larger quantity of Spirits, and also better tasted than if you had distilled your Wine before it had acquired an acid or tartish taste. The same holds

true

true in all fermented Juices of vegetables. Both the Wine and Spirit of Elder are excellent anti-hydropick and anti-scorbutick medicines, and work both by Urine and Sweat; the heavier acid Salt tending downward, whilst the more volatile seeks a passage thro' the finer and smaller Vessels. For it appears upon analysis that this subject abounds with an acid and volatile concrete Salt. By which it comes to be so famous and successful in the cure of the aforesaid diseases; setting open two doors at once, as well for the scorbutick Salts to pass off by, as likewise for the obstructed and stagnating Lympha to be discharged by the urinary passages. If this then be the case, we cannot have a cheaper and pleasanter medicine than the foregoing, the Wine being of a very agreeable and delightful taste; and as a late Author observes, is a suitable drink in scorbutick habits. The Spirit (arising from the same principles) must consequently correspond in the like virtues, but upon the account of its heat and inflammability cannot be taken in the same quantity alone, therefore it is always mix'd in some convenient Vehicle for this end. And as nothing is more pleasant to some palates than Wine, we shall shew how it may be made use of to the greatest advantage: As for instance, were the fore-mention'd Wine of the same product, low, flat, and poor, two Spoonfuls of this Spirit with a lump of Loaf-Sugar put into the Bottle, would serve to recover a quart of it. Or to ten gallons of Elder-Wine, when you tun it up in the Barrel, if you add one gallon of this rectify'd Spirit of Elder, with about six or eight ounces of Loaf-Sugar dissolved in a little of the Wine, all being well mingled together, and the Vessel closed well up; it will, if suffer'd to stand two or three months,

E and

and then drawn off and bottled, be as strong and pleasant as several of the richest foreign Wines. This method will likewise extend to Mead, Cyder, Perry, Black-Cherry-Wine, Currant-Wine, Gooseberry-Wine, &c. all which may be amended and considerably improved by the aforesaid treatment. The true quantity of Spirit and dulcifying cannot certainly be defined, for that must be varied according to the richness or poorness of the Liquor, and the strength which you would have it; some Wines requiring even double the quantity of Spirits and Sweets that others do. Therefore by trying frequent experiments, of adding more or less, according to your palate, you will arrive to the knowledge of discerning at first view, what every particular subject requires or will bear. The Sweets I mentioned above, are nothing but a Syrup made with fine Sugar and fair Water, two parts of the former to one of the latter, boil'd up to the consistency of a Syrup, which may be clarified with the White of an Egg beaten up to a froth, and put into the boiling Syrup, and then skim'd off with all the foulness of the Sugar which adheres to it; and lastly may (if not clean enough) be run through the flannel Slieve whilst it is hot. Note, that the Syrup made this way must just only boil up to dissolve the Sugar, which by that Time is at its due height, and if kept longer over the Fire, would be apt to candy or run into crystals, by the heat of the weather. And therefore 'tis your best method not to clarify it with Eggs, but only to keep stirring it as the Sugar dissolves, which may either be skim'd off or separated from it, by means of the aforesaid Bag.

This simple Syrup is of great use in meliorating and improving artificial Wines, by the assistance

stance of some spirituous body, as Brandy, Spirit of Cyder, Clary, Elder-berries, or any other well tasted rectified Spirit mixed with it: Some few examples of which (to compleat this Work) I shall for the reader's benefit briefly touch upon: As for instance, one pint of any of the aforesaid rectify'd Spirits, with half the quantity of the aforesaid Syrup, put to one gallon of Cyder, or any new-made Wine, will give it the body of French Wine; to which if a due portion of Tartar or Argoll be put, it will resemble Rhenish, and by proper colouring, as described above, Claret. But if you would have it resemble Canary, then there must be a greater proportion of Spirits by one half. To every Gallon (whether of Red-streak Cyder, or Artificial Malaga Wine, which comes nearest in taste and flavour to all those imported of any) you must put in a pint and a half of Spirits (of which Clary is the best) with about twelve ounces of the aforesaid Sweets mixed; which being put into a well season'd Vessel (close bung'd up) for three or four months space will then afford a Wine in all respects equal to Canary. I have several other observations relating to Made-Wines and other cordial rich Liquors, which for brevity's sake I shall be obliged to pass over, or only just touch upon, in the description I am about to give of Raisin-Wine, or what we call,

Artificial Malaga Wine.

TAKE an open-headed Vessel large enough to contain your Fruit and Liquor, then having ready your determined quantity of Rain-Water (boiled a pretty while over the Fire, and

then suffer'd to cool) when it is just Blood-warm, to every ten gallons put forty pounds of good new Raisins, well pick'd and bruised (in a marble Mortar,) beat them well up together, that the Raisins may be all broke out of lumps, then cover up the Vessel close, with Cloths cast thereon, and (if it be in cold weather) set it near the Fire to ferment for twelve or fourteen days, stirring it about once or twice a day, in which time there will be a constant kind of hissing with the casting up of the Raisins to the top of the Liquor: then try if the Liquor be strong and vinous; if so (and the sweetness thereof be almost lost) strain off the Liquor, pressing out the Raisins as hard as you can, first with your Hands, and afterward with a Press, as long as any drop can be squeez'd out; then turn it up in a good and firm Wine-Cask, and to the aforesaid quantity put five pound of fine *Lisbon* Sugar, with a little Ale-yeast (observing that your Vessel be well warm'd and dried before you put the Liquor into it) let it stand for a Month; filling it up from time to time with some of the same Liquor (left out for that purpose) which being expired, stop it up very close that no Air may enter in (altho' it hath not then done hissing) keep it in a Cellar or other cool place for a twelve month, then bottle it up. *Note*, that you may either make use of Raisins of the Sun (as vulgarly called) or of *Malaga*, which are much cheaper.

This prescription affords the best and strongest Wine, and most likest the genuine, of any that are extant; and by reason of its simplicity, is capable of any alteration: For if you would desire it of a Rhenish taste, a little white Tartary or Argoll, put thereto, (with half an Ounce of Isinglass, if you require it for speedy use, otherwise it is as well

well omitted) when you barrel it up, will by age acquire that perfect flavour; likewise the aforesaid Spirit of Clary and sweets, in due quantity as afore prescribed, will afford that of Canary: Or if you shall add to the aforesaid tartarized Rhenish Wine, the juice of Bramble-berries and Spirit of Clary, (or in defect of it *French Brandy*) two parts of the latter to one of the former, proportioned to your quantity of Liquor, with about half a pound of Loaf-Sugar or twelve ounces to the gallon, fining it down with a little Isinglass, and the whites of new laid Eggs mixed with Wheat Flower, all beat up well together, and put into a compact Wine Vessel close stopped up, will in time become wonderful rich, and bear the mark of true *French Claret* in taste and goodness. As to the enriching this artificial *Malaga Wine*, there will be little occasion for it, the Raisins and Sugar being in greater proportion to the quantity of Liquor, than what we meet with in any other prescription of this kind. In most of which there is a necessity to make good the deficiency with *French Brandy*, *Alicant*, and other rich Liquors, by adding one part of the former, and two of the latter, (as for example, one pint of Brandy, with a quart of *Alicant* put to the aforesaid quantity of Wine when tunned up into the Barrel) with one or two new laid Eggs, all well beaten up together; or two drachms of Isinglass to fine it down. Note, that if during the Fermentation of all vinous Liquors, you add the Lees of Wine (the more the better) they will become far richer in taste and flavour, so as scarce to be distinguished from the Wines they were extracted from. The salin-sulphureous principles with which those facultencies abound, and from whence all the distinguishing

stinguishing properties of the subjects result, being put in action by means of Fermentation, will intimately mix with, and consequently communicate their tincture or true flavour, to the whole fermenting mass, by acting upon, and altering the principles of the fermenting fluid: As we learn from daily experience, that those Liquors are always the strongest and best tasted, and upon Distillation afford the greatest quantity of Spirit, which are fermented with a due portion of Wine-Lees. And therefore I advise that in all Liquors whatsoever designed for a Wine or Spirit, a pint or a quart of the aforesaid settlings may be always added to the Liquor designed for Fermentation. As to the transmutation or change of the taste and flavour of Liquors, effected by means of some particular ingredient put to 'em, I shall add little more than what is afore premised. The honourable Mr. Boyle (whom the learned professor Boerhave deservedly calls a prodigy of knowledge) has left us many inventions of this kind. Thus by adding *Rad. Irid. Flor.* ʒi. to ℥ii. of the above-mentioned *Malaga* Wine, you will give it the true taste of Raspberry, which by the addition of *Cochineal*, will afford its due tincture. The Lemmon flavour is likewise effected by *Daucus* Seed, one ounce to a gallon of fermenting Ale, or Wine; and the Spirit and Syrup of Clary counterfeits the Citron flavour, and in Wine approaches that of Canary; as does likewise a simple infusion of the said Flowers in Wine, bring it to a Rhenish. For farther satisfaction upon this head, I must refer the reader to the Author, and make an end of my performance with giving him a description of the Spirit of Cyder.

When your Cyder turns prickt and unfit for drinking

drinking, take a Barrel, or what quantity you please of it, and put it into your Still with a few Raisin stalks, and a little Bay-Salt to keep down the phlegm; then having luted all close, and put fire under, proceed in Distillation as before directed in Low Wines; which being suffered to lye a while, and then again committed to the Still with the aforesaid ingredients, and a few Grains, will afford a very pleasant and well tasted Spirit, fit for the improvement, either of that body from whence it was produced, or any other of the like nature. Only observe that when you design it to add strength to the artificial *French Wines*, four Gallons of this Spirit, with two of Sweets or Syrup, will be sufficient for a Hogshead of Liquor; but when for *Canary*, it will require half as much more of each: And when ever any crude juice is made use of in order to give a colour, as in making of *Claret*, a double proportion will be demanded, to make up the strength of the body of the Liquor, lowered by this means.

Having now finished what I designed for this time, I hope the objections laid against the first part will be fully satisfied by this; for as without laying down the foundations of any art, (which I have endeavoured to do in the preceding pages) the same may be accounted lame and imperfect; and consequently the Treatises written upon it (however compleat they may be said to be) are only shadows and faint representations of the whole; and though the first part of my book taught only (as it has been objected) the making of a few compound Waters, without shewing the essence of the art, which consists in raising a spirituous body, by means of Fermentation, on which the whole superstructure rests and

and depends: Yet this objection has been obviated by the Theory, which I subjoyned (with many excellent and new receipts) in the second part, and is now wholly taken away by what I have added in the third, which teaches the whole nature of Fermentation, the method of raising a vinous Liquor, and from thence a rectified Proof Spirit, with many useful and new remarks upon every particular process. All which I have endeavoured to deliver with the greatest plainness and perspicuity imaginable. So that upon perusal there will be found nothing (I hope) wanting to render the treatise worthy of the title it bears, or necessary for explaining the science. And I may in a manner say, that the former dead substance is hereby enlivened, the curtain, which veiled and shadowed the body of the art, is now withdrawn and exposed to open view; and the former imperfect work is rendered compleat and perfect; insomuch that I may justly conclude in the words of *Heurnius*. *Hæc certe maximi usus in Medicina ars.*

BRITISH



MUSEUM

F I N I S.

